

A radio direction finder such as described above is available from Doppler Systems Inc.

The cellular tracking system as identified at reference numeral 54 is available from Allen Telecom Group Inc.

5 We claim:

1. A method of locating a stolen vehicle provided with a locating cellular transceiver, using the existing cellular network infrastructure, comprising the steps of:

receiving an indication that said vehicle has been stolen;

10 receiving transmitted signals from said cellular transceiver at one or more cell sites within operational range of said cellular transceiver, establishing and maintaining an open voice channel with said locating cellular transceiver of said stolen vehicle;

15 determining a cell site sector within said network in which the stolen vehicle is located based on the location of said one or more cell sites communicating with said locating cellular transceiver;

20 determining a general geographical location of a search vehicle with respect to said one or more cell sites;

dispatching said search vehicle to said cell site sector of said stolen vehicle and monitoring said open voice channel from said search vehicle; and

25 locating said stolen vehicle based on the direction of arrival of RF signals emitted by said cellular transceiver in said stolen vehicle and received at said search vehicle.

2. A method as defined in claim 1, further comprising the step of querying the cellular network for the general location of said stolen vehicle, based on the last known location of said vehicle in said cellular network.

3. A method as defined in claim 2, wherein said step of querying comprises determining the Electronic Serial Number (ESN) of said locating cellular transceiver associated with said stolen vehicle and assigning said ESN with a predetermined Number Assigned Mobile (NAM) such that the locating cellular transceiver associated with the stolen vehicle can be paged by said existing cellular network.

40 4. A method as defined in claim 1, wherein said search vehicle monitors the transmit frequency of said open voice channel.

45 5. A method as defined in claim 4, wherein said search vehicle locates said stolen vehicle using a radio frequency direction finder tuned to said transmit frequency of said open voice channel.

6. A method as defined in claim 5, wherein said locating cellular transceiver is on a full-time standby mode until an indication that said vehicle has been stolen is received.

50 7. A method as defined in claim 6, wherein said locating cellular transceiver is switched to an active mode to open said voice channel, until said stolen vehicle is located.

8. A method as defined in claim 1, wherein the location of said search vehicle with respect to said one or more cell sites is determined by downloading the longitude and latitude coordinates of one of said sites into a GPS receiver mounted on said search vehicle.

9. A system for locating a stolen vehicle provided with a locating cellular transceiver, said system operating using the existing cellular network infrastructure, comprising:

60 means for receiving an indication that said vehicle has been stolen;

cellular radio means for maintaining an open voice channel with said locating cellular transceiver of said stolen vehicle;

65 means for determining a cell site sector within said network in which the stolen vehicle is located based on

the location of one or more cell sites communicating with said locating cellular transceiver;

locator means for determining a general geographical location of a search vehicle with respect to said one or more cell sites; 5

radio means for monitoring said open voice channel from said search vehicle; and

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radio location finder means for locating said stolen vehicle based on the direction of arrival of RF signals emitted by said cellular radio means in said stolen vehicle and received at said search vehicle.

- 5 10. A method as defined in claim 1, further comprising a step of paging said locating cellular transceiver.

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11. A method of obtaining locating information concerning a locating cellular transceiver using an existing cellular network infrastructure, comprising the steps of:

receiving transmitted signals from said cellular transceiver at one or more cell sites within operational range of said cellular transceiver;

establishing and maintaining an open voice channel with said locating cellular transceiver;

determining a cell site sector within said network in which the cellular transceiver is located based on the location of said one or more cell sites communicating with said locating cellular transceiver;

determining a general geographical location of a search vehicle with respect to said one or more cell sites;

moving said search vehicle to said cell site sector of said cellular transceiver and monitoring said open voice channel from said search vehicle; and

obtaining a direction in which said cellular transceiver is located with respect to said search vehicle based on the direction of arrival of RF signals emitted by said cellular transceiver and received at said search vehicle.

12. A method as defined in claim 11, further comprising the step of querying the cellular network for the general location of said transceiver based on the last known location of said transceiver in said cellular network.

13. A method as defined in claim 12, wherein said step of querying comprises determining an Electronic Serial Number (ESN) of said locating cellular transceiver associated with said stolen vehicle and assigning said ESN with a

predetermined Number Assigned Mobile (NAM) such that the locating cellular transceiver associated with the stolen vehicle can be paged by said existing cellular network.

14. A method as defined in claim 11, wherein said search vehicle monitors the transmit frequency of said open voice channel.

15. A method as defined in claim 14, wherein said search vehicle locates said cellular transceiver using a radio frequency direction finder tuned to said transmit frequency of said open voice channel.

16. A method as defined in claim 15, wherein said locating cellular transceiver is on a full-time standby mode until an indication that said transceiver needs to be located.

17. A method as defined in claim 16, wherein said locating cellular transceiver is switched to an active mode to open said voice channel until said transceiver is located.

18. A method as defined in claim 11, wherein the location of said search vehicle with respect to said one or more cell sites is determined by downloading the longitude and latitude coordinates of one of said sites into a GPS receiver mounted on said search vehicle.

19. A method as defined in claim 11, further comprising a step of paging said locating cellular transceiver.

20. A method as defined in claim 11, further comprising a step of concealingly mounting said transceiver within a vehicle to be located if stolen, wherein said method serves to locate a stolen vehicle.

21. A method as defined in claim 20, wherein said transceiver comprises a rechargeable battery supply and is connected to a battery power supply of an engine of said stolen vehicle.

22. A method of obtaining locating information concerning a locating cellular transceiver using an existing cellular network infrastructure, said infrastructure receiving transmitted signals from said cellular transceiver at one or more cell sites within operational range of said cellular transceiver, establishing and maintaining an open voice channel with said locating cellular transceiver, determining a cell site sector within said network in which the transceiver is located based on the location of said one or more cell sites communicating with said locating cellular transceiver, the method comprising the steps of:

placing a request with said existing cellular network infrastructure to determine said cell site sector for said cellular transceiver and to maintain said open voice channel and obtaining in response to said request an identification of said cell site sector;

determining a general geographical location of a search vehicle with respect to said one or more cell sites;

moving said search vehicle to said cell site sector of said transceiver and monitoring said open voice channel from said search vehicle; and

obtaining a direction in which said transceiver is located with respect to said search vehicle based on the direction of arrival of RF signals emitted by said cellular transceiver and received at said search vehicle.

23. A method as defined in claim 22, wherein said obtaining said direction of said transceiver comprises using a radio frequency direction finder tuned to a transmit frequency of said open voice channel.

24. A method as defined in claim 22, wherein the location of said search vehicle with respect to said one or more cell sites is determined by downloading the longitude and latitude coordinates of one of said sites into a GPS receiver mounted on said search vehicle.

25. A method as defined in claim 22, further comprising the step of querying the cellular network for the general location of said transceiver based on the last known location of said transceiver in said cellular network.

26. A method as defined in claim 25, wherein said step of querying comprises determining an Electronic Serial Number (ESN) of said locating cellular transceiver associated with said stolen vehicle and assigning said ESN with a predetermined Number Assigned Mobile (NAM) such that the locating cellular transceiver associated with the stolen vehicle can be paged by said existing cellular network.

27. A method as defined in claim 22, wherein said locating cellular transceiver is on a full-time standby mode until an indication that said transceiver needs to be located.

28. A method as defined in claim 27, wherein said locating cellular transceiver is switched to an active mode to open said voice channel until said transceiver is located.

29. A method as defined in claim 22, further comprising a step of paging said locating cellular transceiver.

30. A method as defined in claim 22, further comprising a step of concealingly mounting said transceiver within a vehicle to be located if stolen, wherein said method serves to locate a stolen vehicle.

31. A method as defined in claim 30, wherein said transceiver comprises a rechargeable battery supply and is connected to a battery power supply of an engine of said stolen vehicle.